CLAIMS

What is claimed is:

1. A method for early detection of a pregnancy complication, the method comprising:

touching a position sensor to a point on a fetal presenting part of a fetus in a mother, and capturing a position of the position sensor;

touching the position sensor to a set of points on the mother and capturing the position of the position sensor at each point; and

detecting a pregnancy complication sign based upon a predefined criterion for said pregnancy complication.

2. The method according to claim 1, wherein said predefined criterion comprises at least one of contractions with a predetermined frequency, cramping, pelvic pressure, excessive vaginal discharge, back pain, premature rupture of membrane (PROM), cervical dilation greater than a predefined amount, and effacement greater than a predefined amount.

3. A method for identifying a BPD (bi-parietal diameter) pattern in an ultrasound image, the method comprising:

identifying an effective ultrasound beam (EUB) area;

identifying a fetal head contour within the EUB area; and

identifying a BPD signature within the fetal head contour.

4. The method according to claim 3, comprising using an ellipse mask to find said fetal head contour.

5. A method for approximating a fetal head by a three-dimensional ellipsoid, the method comprising:

identifying fetal head voxels in two-dimensional ultrasound images of fetal head cross-sections;

defining a stabile fetal head ellipsoid using the identified fetal head voxels; and

using asymmetry of the identified fetal head voxels to determine the face orientation and BPD orientation.

6. The method according to claim 5, further comprising visualizing the fetal head with an ellipse defined by an ellipsoid cross-section.

7. The method according to claim 5, further comprising visualizing the fetal head with an ultrasound probe that coincides with a plane of the BPD.

8. The method according to claim 5, wherein defining the stabile fetal head ellipsoid comprises:

defining an expected surface by 3D quadratic form, second order coefficients;

setting at least one of the coefficients to a non-zero value, and calculating the rest of the coefficients using a standard deviation method; and

choosing from sets of coefficients that define the expected surface the set that most strictly defines an ellipsoid.

9. A method for identifying a relevant head plane to pass through a pelvic inlet, the method comprising:

constructing a three-dimensional model of a fetal head and a pelvic inlet;

checking dimensions of a set of fetal head planes and their spatial orientations relative to the pelvic inlet; and

selecting a plane from the fetal head planes with the best spatial orientation relative to the pelvic inlet.

10. The method according to claim 9, wherein said pelvic inlet is modeled by an ellipse.

11. A method for determining characteristics of body parts outside of a pelvic region, the method comprising:

mapping body parts outside of a pelvic region by using at least one of an external location sensor and an external ultrasound transmitter; and

enhancing mapping of said body parts by at least one of extrapolation and model stretching.

12. A method for BPD reconstruction, the method comprising:

collecting ultrasonic images of a volume containing a fetus along with 3D positional data;

using known calibration information to translate pixels of the ultrasonic images to the true 3D position of those pixels;

selecting an image and marking a fetal skull in the image; and

projecting the marked fetal skull image onto another ultrasound image, which represents a different plane in the 3D space.

13. The method according to claim 12, wherein marking the fetal skull in the image comprises manually selecting one of the collected images and marking the contour of fetal skull in the image.

14. The method according to claim 12, wherein marking the fetal skull in the image comprises automatically selecting an image with a high signal-to-noise ratio and with clear marks of a fetal skull contour.

15. Apparatus comprising:

an adapter comprising a position sensor assembled with a sleeve.

16. Apparatus according to claim 15, wherein said position sensor is inserted into said sleeve.

17. Apparatus according to claim 15, wherein said position sensor is attached to said sleeve.

18. Apparatus according to claim 15, wherein said position sensor is attached to a rigid mechanical connection which is assembled with said sleeve.

19. Apparatus according to claim 15, wherein said sleeve comprises an elastic, stretchable sleeve into which the position sensor is inserted.

20. Apparatus according to claim 15, wherein said sleeve comprises a rigid receptacle with a recess into which the position sensor is inserted.

21. Apparatus according to claim 20, wherein said receptacle comprises a releasing lever that the position sensor engages when inserted in the recess, said releasing lever being adapted to selectively release the position sensor to permit removal from said receptacle.

22. Apparatus according to claim 15, wherein said sleeve is attached to an attachment device.

23. Apparatus according to claim 22, wherein said attachment device comprises a resilient arm.

24. Apparatus according to claim 22, wherein said attachment device comprises an electrode.

25. Apparatus according to claim 22, wherein said attachment device comprises a clamp with jaws.

26. Apparatus according to claim 25, wherein said jaws are actuated by a drawstring attached thereto.

27. Apparatus according to claim 25, further comprising a finger receptacle attached to said adapter for placing therein a finger.